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Supplement to the SERVICE BINDER for the *Kodak X-Omat* 180 LP and 180 LPS PROCESSORS Service Codes: 3227 and 3198 with the 5000 BOARD

Important
Qualified service personnel must install this equipment.

HEALTH IMAGING

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This equipment includes parts and assemblies sensitive to damage from electrostatic discharge. Use caution to prevent damage during all service procedures.

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Section 1: Introduction

General Information

The 500 BOARD can no longer be manufactured. Parts are not available. The 5000 BOARD is used as the replacement. The 5000 BOARD is larger than the 500 BOARD, but the MOUNTS and the CONNECTORS are the same as the 500 BOARD. When the 5000 BOARD is a replacement for a 500 BOARD, it is necessary to install updated software and the CLOCK MEMORY MODULE. The updated software does not change the operation of the PROCESSOR, but additional error codes improve diagnostic procedures.

The 5000 BOARD will be installed into production units starting with serial number:

- 100,300 for the 180 LP PROCESSOR
- 125,350 for the 180 LPS PROCESSOR

The 500 BOARD cannot be used in these units because of a difference in the DC INTERNAL HARNESS.

Important

Installing a 5000 BOARD in a PROCESSOR is not necessary if the 500 BOARD is operating correctly. When the 500 BOARD is no longer available, the 5000 BOARD is sent automatically. The following publications are available to provide service on the 5000 BOARD.

Publication	No.
INSTALLATION INSTRUCTIONS for the 5000 BOARD on the *Kodak X-Omat* 180 LP and LPS PROCESSORS, the *Kodak X-Omat* 270 RA and 480 RA PROCESSORS, and the *Kodak X-Omat* 3000 RA INTEGRATED PROCESSOR	6E5138
INSTALLATION INSTRUCTIONS for the OPERATING SOFTWARE DISK on the *Kodak X-Omat* 180 LP and LPS PROCESSORS, the *Kodak X-Omat* 270 RA and 480 RA PROCESSORS, and the *Kodak X-Omat* 3000 RA INTEGRATED PROCESSOR with the 5000 BOARD	6E5135
INSTALLATION INSTRUCTIONS for the DIAGNOSTICS DISK on the *Kodak X-Omat* 180 LP and LPS PROCESSORS and the *Kodak X-Omat* 3000 RA INTEGRATED PROCESSOR with the 5000 BOARD	7E6487
Supplement to the SERVICE BINDER for the *Kodak X-Omat* 180 LP and LPS PROCESSORS with the 5000 BOARD	3E0811

This supplement includes:

- DIAGNOSTICS for the error codes
- DIAGRAMS
- ILLUSTRATED PARTS LIST for the 5000 BOARD

There is a separate publication with a different part number for each PROCESSOR.

Section 2: Diagnostics for the 5000 BOARD in the PROCESSOR

Error Codes

Introduction

The software on the 5000 BOARD controls and monitors the operation of the PROCESSOR and continually checks for errors. When an error occurs, the DISPLAY PANEL of the PRINTER displays a description of the error.

When 2 or more errors occur together, all the errors are displayed, but the DISPLAY PANEL displays only one error at a time. The error with the highest priority is displayed first.

All errors are stored in an error log on the 5000 BOARD. A LAPTOP COMPUTER with the correct software provides access to the error log. The error log indicates the error and frequency of occurrence of the following errors:

- Fatal
- Nonfatal
- Warning

Fatal and Nonfatal Errors

Only qualified service personnel should repair both fatal and nonfatal errors.

Most fatal errors prevent optimum film processing. Most nonfatal errors do not prevent optimum film processing

Software de-energizes some subsystems to prevent damage. Reset the PROCESSOR by energizing and de-energizing using CB1.

When you service a PROCESSOR with a fatal or nonfatal error and check an electrical component or BOARD, also check:

- connections for the component or BOARD
- voltages from the POWER SUPPLY for the component or BOARD

Warning Errors

Operators can:

- repair warning errors
- override some errors to allow the PRINTER to send film

When you check an electrical component or BOARD for any error, also check:

- connections and CABLES
- voltages from the POWER SUPPLY

Check the SOLID STATE RELAYS. See “Troubleshooting the SOLID STATE RELAYS” on Page 13.

Fatal Errors

Code	Description	Possible Cause	Action
E001	MICROCONTROLLER error	If the LASER PRINTER displays this error message, you must use laptop diagnostics for the PROCESSOR to determine the specific error code.	
		5000 BOARD	Install a new 5000 BOARD.
E002	DRYER over maximum temperature **Note** The maximum temperature is 79°C (175°F). Normally, the DRYER DC OVER-TEMPERATURE THERMOSTAT opens before the DRYER reaches this temperature.	DRYER THERMISTOR	Check for approximately 10 kΩ resistance at 25°C (77°F).
		SOLID STATE RELAY U3 (DS5)	Check for correct operation of SSR U3. See "Troubleshooting the SOLID STATE RELAYS" on Page 13.
E005	DRYER: • Loss of air flow • OVER-TEMPERATURE THERMOSTAT is open	When this error occurs, the DRYER HEATER and BLOWER are disabled.	
		AIR FLOW SWITCH	Check for correct operation.
		DRYER OVER-TEMPERATURE THERMOSTAT	Reset the THERMOSTAT or install a new THERMOSTAT. If the THERMOSTAT opens again, determine the cause of the over-temperature condition. See E002.
		DRYER BLOWER	Check: • FUSE F1 • correct operation of the BLOWER
		K5002 (DS7)	1. Check for correct operation. 2. If the 5000 BOARD has RELAYS that can be removed, do a replacement of RELAY K5002. 3. If the RELAY cannot be removed, do a replacement of the 5000 BOARD.
E007	Failure of the DEVELOPER THERMISTOR	The DEVELOPER HEATER is disabled when this error occurs.	
		DEVELOPER THERMISTOR	Install a new THERMISTOR.
E008	Failure of the FIXER THERMISTOR	The FIXER HEATER is disabled when this error occurs.	
		FIXER THERMISTOR	Install a new THERMISTOR.
E009	Failure of the DRYER THERMISTOR	The DRYER HEATER is disabled when this error occurs.	
		DRYER THERMISTOR	Install a THERMISTOR.
E010	Failure of the ANALOG-TO-DIGITAL CONVERTER	All 3 HEATERS are disabled when this error occurs.	
		5000 BOARD	Install a new 5000 BOARD.
E013	Failure of the circuit for the LEVEL SENSOR	This error occurs when the circuit for the LEVEL PROBE on the 5000 BOARD malfunctions. The following parts are disabled: • DEVELOPER and FIXER REPLENISHMENT PUMPS • RECIRCULATION PUMP	
		5000 BOARD	Install a new 5000 BOARD.

Nonfatal Errors

Code	Description	Possible Cause	Action
E032	DEVELOPER TANK fill error	This error occurs if the: • DEVELOPER TANK – does not fill in 4 minutes in normal operation – does not fill in 15 minutes in the Tank Fill Mode – is empty and the operator does not select the Tank Fill Mode • REPLENISHMENT TANK is empty • REPLENISHMENT HOSE has an obstruction • TANKS of the PROCESSOR are filled with water during the first installation The following are disabled: • DEVELOPER REPLENISHMENT PUMP • RECIRCULATION PUMP • Temperature control for the fixer and the developer To prevent the error from occurring during the first installation: • Add 240 mL (8 fl oz) of developer to the DEVELOPER TANK before you fill the PROCESSOR with water. • Energize the RECIRCULATION PUMP to move the developer and remove air bubbles. Use the diagnostics for the LAPTOP COMPUTER to energize the PUMP.	
		LEVEL PROBES	Clean and check the PROBES.
		The solution level in the REPLENISHER TANK is low.	Mix a developer solution.
		Solution does not flow through the HOSES between the REPLENISHMENT TANK and the REPLENISHMENT PUMP.	Check: • HOSE CLAMPS are tight • HOSES – are round and open – have no obstructions or air bubbles
		DEVELOPER DRAIN VALVE	Check that the VALVE is closed.
		DEVELOPER REPLENISHMENT PUMP	1. Check: • FUSE F1 • correct operation of the REPLENISHMENT PUMP MOTOR B3 • correct operation of the POPPET VALVES inside the REPLENISHMENT PUMP 2. Clean or do a replacement as necessary.
		SOLID STATE RELAY U4 (DS3)	Check for correct operation of SSR U4. See “Troubleshooting the SOLID STATE RELAYS” on Page 13.
		K5006 (DS11)	1. Check for correct operation. 2. If the 5000 BOARD has RELAYS that can be removed, do a replacement of RELAY K5006. 3. If the RELAY cannot be removed, do a replacement of the 5000 BOARD.

Code	Description	Possible Cause	Action
E033	FIXER TANK fill error	This error occurs if: • FIXER TANK: – does not fill in 4 minutes in normal operation – does not fill in 15 minutes in the Tank Fill Mode – is empty and the operator does not select the Tank Fill Mode • REPLENISHMENT TANK is empty • REPLENISHMENT HOSE has an obstruction • TANKS of the PROCESSOR are filled with water during the first installation The following are disabled: • FIXER REPLENISHMENT PUMP • RECIRCULATION PUMP • Temperature control for the fixer and developer To prevent the error from occurring during the initial installation: • Add 240 mL (8 fl oz) of fixer to the FIXER TANK before you fill the PROCESSOR with water. • Energize the RECIRCULATION PUMP to move the fixer and remove any air bubbles. Use the diagnostics to energize the PUMP.	
		LEVEL PROBES	Clean and check the PROBES.
		The solution level in the REPLENISHER TANK is low.	Mix new fixer solution.
		Solution does not flow through the HOSES between the REPLENISHMENT TANK and the REPLENISHMENT PUMP.	Check: • HOSE CLAMPS are tight • HOSES: – are round and opened – have no obstructions or air bubbles
		FIXER DRAIN VALVE	Check that the VALVE is closed.
		FIXER REPLENISHMENT PUMP	1. Check: • FUSE F1 • correct operation of the REPLENISHMENT PUMP MOTOR B4 • correct operation of the POPPET VALVES inside the REPLENISHMENT PUMP 2. Clean or do a replacement as necessary.
		SOLID STATE RELAY U2 (DS2)	Check for correct operation of SSR U2. See “Troubleshooting the SOLID STATE RELAYS” on Page 13.
		K5006 (DS11)	1. Check for correct operation. 2. If the 5000 BOARD has RELAYS that can be removed, do a replacement of K5006. 3. If the RELAY cannot be removed, do a replacement of the 5000 BOARD.

Code	Description	Possible Cause	Action
E037	Loss of DEVELOPER heating ability	When the DEVELOPER HEATER is extremely hot, the OVER-TEMPERATURE THERMOSTAT opens. Wait for the DEVELOPER HEATER to cool and the OVER-TEMPERATURE THERMOSTAT to reset before measuring the resistance.	
		DEVELOPER HEATER HR1	Check: • FUSE F2 • for approximately 70.5 Ω resistance at 25°C (77°F)
		SOLID STATE RELAY U5 (DS4)	Check for correct operation of SSR U5. See "Troubleshooting the SOLID STATE RELAYS" on Page 13.
		RELAY K5004 (DS9)	1. Check for correct operation. 2. If the 5000 BOARD has RELAYS that can be removed, do a replacement of RELAY K5004. 3. If the RELAY cannot be removed, do a replacement of the 5000 BOARD.
		RECIRCULATION PUMP	Check: • FUSE F1 • voltage to RECIRCULATION PUMP MOTOR B5 • correct operation of the RECIRCULATION PUMP
		DEVELOPER COOLING SOLENOID L2	Check that the SOLENOID is shutting off the developer flow through the HEAT EXCHANGER.

Code	Description	Possible Cause	Action
E038	Loss of developer cooling ability	Water does not enter the WASH TANK.	Check: • water supply to the PROCESSOR – water supply is turned on – FILTER is clean • WASH WATER SOLENOID L1 – operation is correct – SCREEN has no obstructions • DEVELOPER COOLING SOLENOID L2 • QUICK DISCONNECT
		The temperature of the water entering the WASH TANK is too hot.	Decrease the temperature of the water supply. The wash water must be a minimum of 5.5°C (42°F) below the set point of the developer.
		HEAT EXCHANGER in the WASH TANK	Remove any obstructions from the EXCHANGER.
		The 5000 BOARD does not energize SOLENOIDS: • WASH WATER SOLENOID L1 • DEVELOPER COOLING SOLENOID L2	1. Check that the correct LED on the 5000 BOARD is energized: • DS15 for L1 • DS14 for L2 2. Check for 24 V DC at TERMINALS 1 and 2 on: • WASH WATER SOLENOID L1 • DEVELOPER COOLING SOLENOID L2 3. If necessary, install a 5000 BOARD.
		There is AC power at the RECIRCULATION PUMP, but the PUMP does not operate.	Check the RECIRCULATION PUMP MOTOR B5. If necessary, install a PUMP.
		There is no AC power to the RECIRCULATION PUMP	1. If the 5000 BOARD has RELAYS that can be removed, install RELAY K5003. 2. Check for correct operation. 3. If the RELAY cannot be removed, install a 5000 BOARD.
		The WASH TANK CLIP is not fully seated or is not installed.	Check that the CLIP is fully seated. If necessary, install the CLIP again.

Code	Description	Possible Cause	Action
E039	Loss of fixer heating ability	When the FIXER HEATER HR2 is extremely hot, the OVER-TEMPERATURE THERMOSTAT opens. Wait for the FIXER HEATER to cool and the OVER-TEMPERATURE THERMOSTAT to reset before measuring the resistance.	
		FIXER HEATER HR2 is open or has a short circuit, or the resistance is not correct.	Check: • FUSE F2 • for approximately 70.5 Ω resistance at 25°C (77°F)
		SOLID STATE RELAY U1 (DS1)	Check for correct operation of SSR U1. See “Troubleshooting the SOLID STATE RELAYS” on Page 13.
		RELAY K5004 (DS9)	1. Check for correct operation. 2. If the 5000 BOARD has RELAYS that can be removed, do a replacement of RELAY K5004. 3. If the RELAY cannot be removed, do a replacement of the 5000 BOARD.
		RECIRCULATION PUMP	Check: • FUSE F1 • correct operation of MOTOR B5

Code	Description	Possible Cause	Action
E040	Inoperative DRYER **Note** A malfunction of the AIRFLOW SWITCH cannot cause this error if 24 V DC does not occur at the COIL of RELAY K7.	A PANEL or DRYER RACK is not installed.	Install the part.
		SOLID STATE RELAY U3 (DS5) that controls the DRYER HEATER	Check for correct operation of SSR U3. See "Troubleshooting the SOLID STATE RELAYS" on Page 13.
		RELAY K7	Check for correct operation.
		DRYER HEATER HR3	Check for approximately 22 Ω resistance at 25°C (77°F).
		RELAY K5001 (DS6) **Note** This RELAY controls the COIL of RELAY K7.	1. Check for correct operation. 2. If the 5000 BOARD has RELAYS that can be removed, do a replacement of K5001. 3. If the RELAY cannot be removed, do a replacement of the 5000 BOARD.
		DRYER OVER-TEMPERATURE THERMOSTAT	1. Reset the THERMOSTAT. 2. If the THERMOSTAT opens again, determine the cause of the high temperature. 3. If you cannot determine the cause of the problem, install a THERMOSTAT.
E042	Loss of accessory data link	Loose connections	Check all connections between the PRINTER and the PROCESSOR.
E043	STATIC RAM BATTERY failure	Battery powered RAM is corrupted. The cycle default values are loaded into the cycle process parameters. Any changes are not saved during power down.	Do a replacement of the CLOCK/ MEMORY MODULE U21. **Note** You need to enter any custom process parameters, set points.

Warnings

Code	Description	Possible Cause	Action
E128	The TOP COVER is not installed correctly.	When this error occurs, the following are disabled: • film transport • DRYER HEATER • BLOWER	
		The TOP COVER is open.	Close the TOP COVER.
		INTERLOCK SWITCH S4	Check SWITCH S4. If necessary, install SWITCH S4.
E129	The TANKS are filling.	When this error occurs, the following are disabled: • film transport • RECIRCULATION PUMP • 3 HEATERS • DRYER BLOWER	
		None	None. This message clears automatically.
E130	The REPLENISH PUMPS are disabled.	None	Use the KEYPAD to select either “Automatic” or “Flooded Replenishment” to enable the PUMPS.
E132	DEVELOPER under set temperature		This message clears automatically when the developer reaches the set point temperature.
E133	DEVELOPER over set temperature		
E134	DRYER under set temperature		
E139	EXIT SENSOR warning	The PROCESSOR senses film at the EXIT SENSOR for a longer time than it would take for film to pass. **Note** • The PROCESSOR continues to accept film. • No FILM EXITED commands are being sent to the PRINTER.	Check: • for film jam at the DRYER exit • connections or correct operation of the EXIT SENSOR

Note

Also see “Diagnostics for the SORTER” on Page 22.

Troubleshooting the SOLID STATE RELAYS

Theory

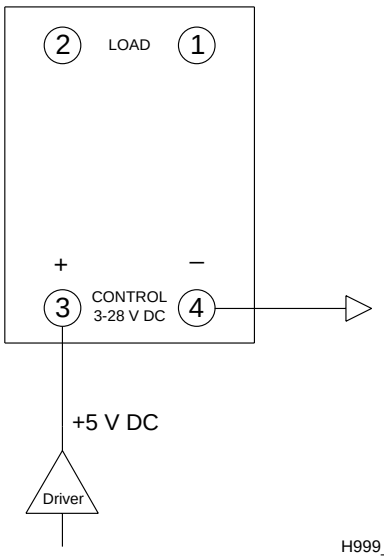
SOLID STATE RELAYS (SSRs) are primarily used in the PROCESSORS to control HEATER loads that switch on and off several times per minute. The main advantage of using SSRs is the increased reliability compared to conventional electromechanical RELAYS. SSRs have the additional advantage of a reduced current requirement for the control voltage.

SSRs are applied in 2 different classes of PROCESSORS:

- The first application is in older PROCESSORS, such as the *Kodak* RP *X-Omat* PROCESSOR, MODELS M6B/M7B, the *Kodak X-Omat* 2000 PROCESSOR, and the *Kodak Min-R* MAMMOGRAPHY PROCESSOR. This application applies a 12 V DC signal to the control side of the RELAY in order to energize the AC HEATER load.
- The other application is in *Kodak X-Omat* 180 LP PROCESSOR and the *Kodak X-Omat* 270/3000/5000 RA PROCESSORS that use a +5 V DC control signal. Both applications use the RELAY to control large HEATER loads with low voltage DC signals.

The difference between the 2 applications is the value of the control signal and how it is applied to the RELAY.

RA PROCESSORS



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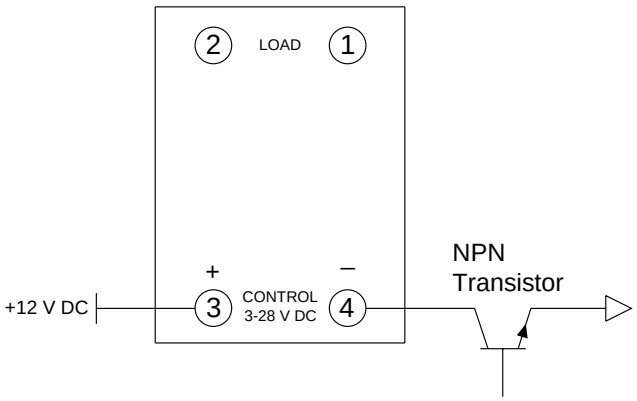
In RA PROCESSORS, the negative TERMINAL is permanently connected to ground. The RELAY is switched on when +5 V DC is applied to the positive TERMINAL. This +5 V DC comes from an INTEGRATED CIRCUIT DRIVER located on either the 500 BOARD or the 5000 BOARD. If a DC meter is placed across the control TERMINALS, the RELAY is considered ON if +5 V DC, ranges from 3 - 5 V DC, is measured from the positive to the negative TERMINALS. These measurements must be made across the TERMINALS.

Other PROCESSORS



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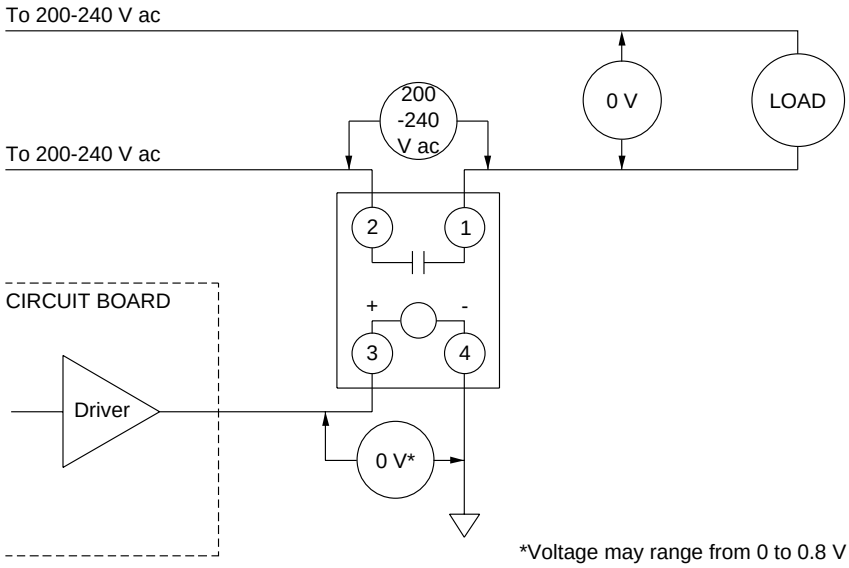
In other PROCESSORS, 12 V DC is applied to the positive, or plus, TERMINAL of the SSR and the RELAY is turned on by switching the negative, or minus, TERMINAL to ground. If a DC meter is placed across the control TERMINALS, the RELAY is considered ON if +12 V DC, ranges from 9 - 12 V DC, is measured from the positive to the negative TERMINALS. These measurements must be made across the TERMINALS.

Normal Voltages for the OFF Mode

Important

Normal circuits, normally checked with a VOLTMETER, are in the ON and OFF modes and with normal voltage applied. The voltage measurements are approximate.



*Voltage may range from 0 to 0.8 V dc.

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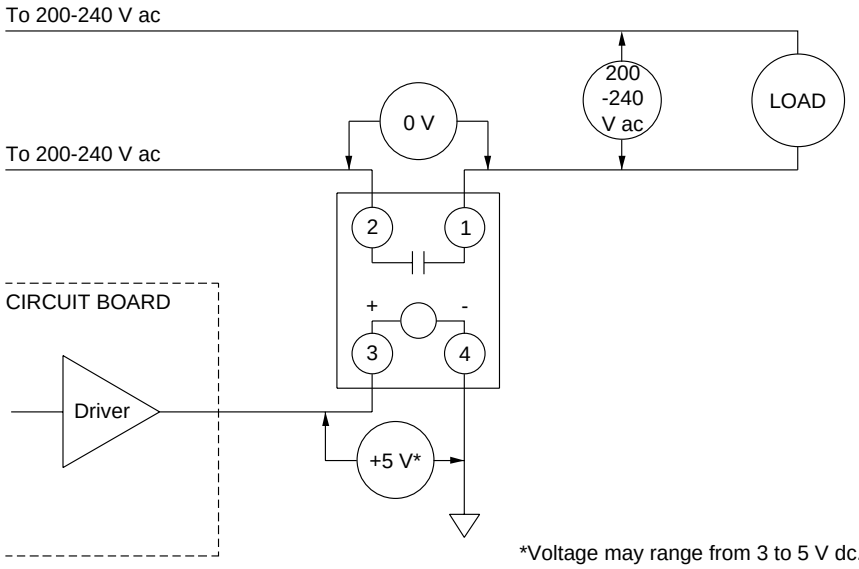
Normal Voltages for the ON Mode



*Voltage may range from 3 to 5 V dc.

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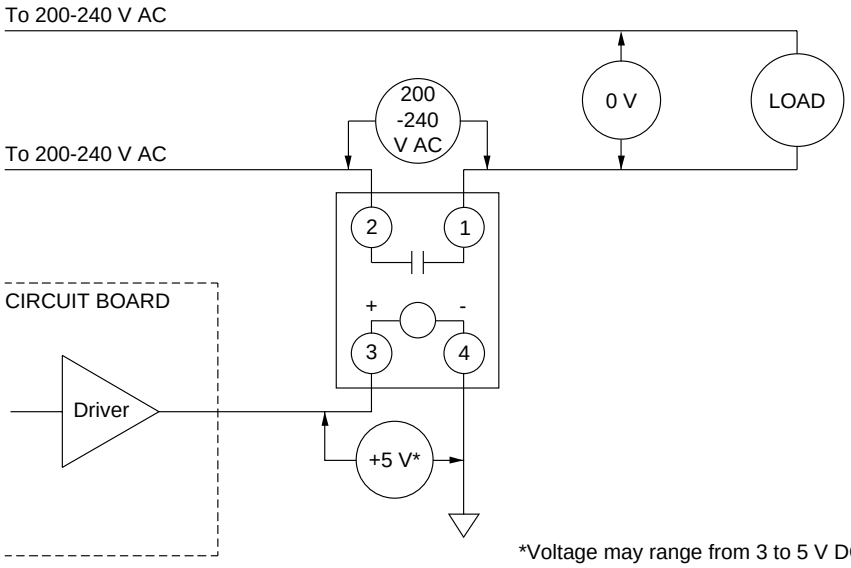
Open Circuit Voltages



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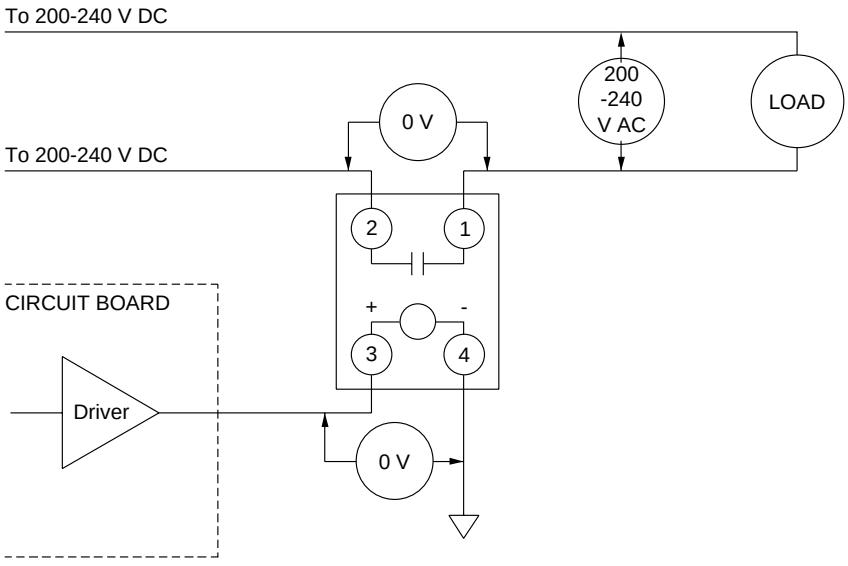
RELAY voltage controls such as SSRs are complex. There are 4 primary conditions which might indicate malfunctions connected with an SSR.

The SSR has an open circuit. The load is never ON. The control voltage occurs, 5 V DC across PINS 3 and 4, but the RELAY does not energize.

Short Circuit Voltages



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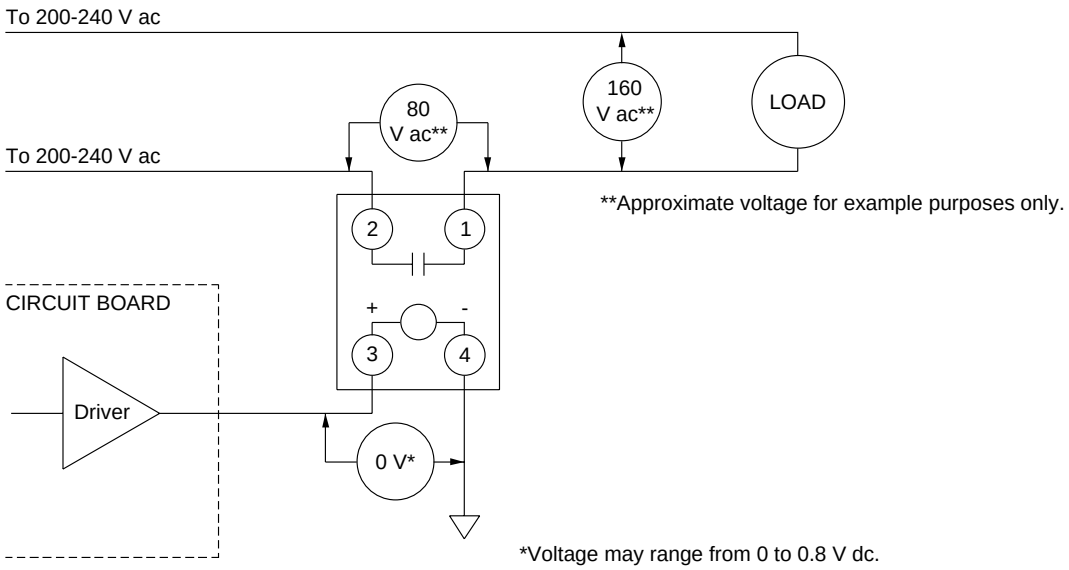
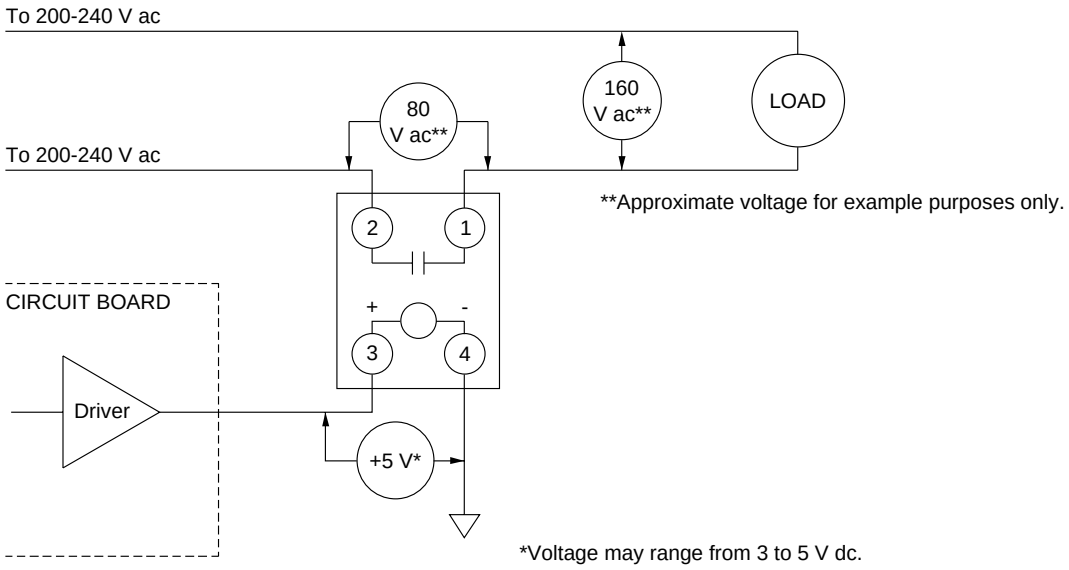
The SSR has a short circuit. The load is always ON. The control voltage does not occur, 0 V across PINS 3 and 4, but the load is energized.

Half-Wave Short Circuit Voltages with Control Voltage OFF



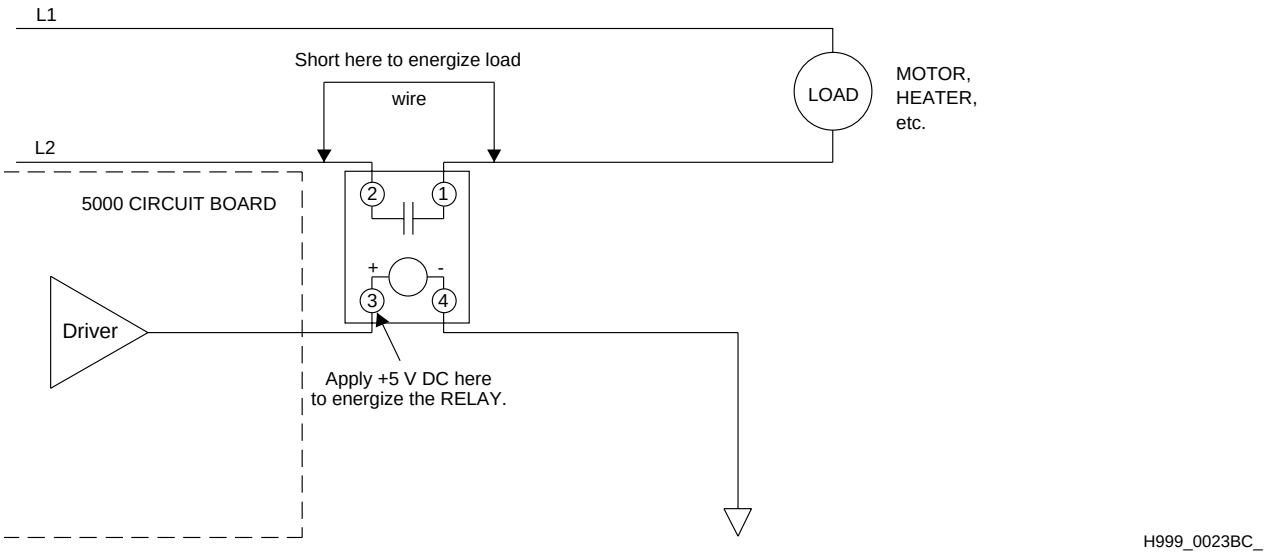
In a half-wave short circuit, the load is always partially ON. When no control voltage is present, 0 V across PINS 3 and 4, the load has low voltage power. This is because half of the SSR has a short circuit and passes half-wave rectified alternating current to the load. A meter indicates a voltage between 240 V AC and 0 V across the load. When logic turns the SSR on, the load operates normally.

Half-Wave Open Circuit Voltages with Control Voltage ON



In a half-wave open circuit, half of the SSR is never ON, and half is ON when controlled. The SSR is activated by the signal from the BOARD, 5 V DC across PINS 3 and 4, but the load has only low voltage power supplied. This is caused by an open circuit of half of the SSR, and can only provide half-wave rectified alternating current to the load. The VOLTMETER indicates a voltage between 240 V AC and 0 V across the load when the SSR is energized. In this condition, half of the SSR is always OFF.

Wire Test



Before doing a replacement of parts, do these tests to locate the problem. The 3 possibilities are:

1. Control voltage is supplied. The SSR is reacting, but the load does not operate.

   Result: A failure has occurred on the load, MOTOR, HEATER, etc.

2. Control voltage is supplied, but the SSR is not conducting.

   Result: A failure has occurred on the SOLID STATE RELAY.

3. The 5000 BOARD does not supply the control voltage at the correct time.

   Result: A failure has occurred on the 5000 BOARD.

Mechanical Errors

Transport Malfunctions

Solutions for the RACKS and CROSSOVERS

[1] Check:

- RACKS and CROSSOVERS are seated and installed correctly
- for squareness of the RACKS and CROSSOVERS
- RACKS and CROSSOVERS are completely cleaned
- CROSSOVER TROUGHS are in the correct positions
- WATER YOKE is installed correctly

Solutions for the ROLLERS

[1] Check:

- ROLLERS are correctly positioned and are rotating freely
- ROLLER GEARS, SPROCKETS, and IDLERS are engaged

[2] Install ROLLERS if broken or GUDGEONS have wear.

[3] If any BEARINGS have wear, remove and install BEARINGS.

[4] If any SPRINGS or E-RINGS are broken, install SPRINGS or E-RINGS.

[5] Adjust the tension on the RACK CHAIN so that the ROLLERS operate smoothly.

Solutions for the DRYER

[1] Check:

- DRYER AIR TUBES are in the correct positions
- DRYER TEMPERATURE CONTROL KNOB is set to the lowest possible temperature that allows the film to dry
- DRYER RACK and EXIT RACK are seated correctly and the LOCKING TABS are in the correct positions
- for damage to the DRYER DRIVE GEAR

Miscellaneous Solutions

[1] Check that the TOP COVER is closed.

Surface Artifacts or Densities that are not Normal

Replenishment Solutions

[1] Check:

- replenishment rates are set for correct replenishment
- replenishment calibration is correct
- TUBING of the REPLENISHMENT SYSTEM is not bent or pinched
- REPLENISHMENT PUMP is operating
- HOSE CLAMPS are tight
- LEVEL SENSOR PROBES and CONNECTORS are cleaned

[2] Change any chemicals that were not mixed correctly, are exhausted, or are contaminated.

[3] When mixing chemicals, the following are recommend:

- mix a maximum of a 2 week supply of DEVELOPER REPLENISHER
- mix all chemicals and solutions as directed
- prevent contaminating the developer using a SPLASH GUARD and DRIP TRAY when removing the FIXER RACK from the PROCESSOR

[4] Fill the REPLENISHER TANKS if the solution levels are low.

[5] Check:

- DRAIN VALVES are completely closed
- TANKS are full

Recirculation Solutions

[1] Check that the ORIFICES in the DEVELOPER and the FIXER RECIRCULATION HOSE are not blocked.

[2] Install a DEVELOPER FILTER.

[3] With the PROCESSOR energized and the processing TANKS full, check for movement of the solutions at the surface of the TANKS. Movement indicates recirculation. If no movement is observed, check:

- TUBING for the RECIRCULATION SYSTEM is not bent or pinched
- PUMP is operating
- DEVELOPER FILTER is correctly positioned

Solutions for the RACKS and CROSSOVERS

[1] Check:

- RACKS and CROSSOVERS are in the correct position
- RACKS and CROSSOVERS are clean
- CROSSOVER TROUGHS and the EVAPORATION COVERS are in the correct positions
- WATER YOKE is installed correctly
- RACKS are correctly seated

Solutions for the ROLLERS

[1] Check that the surfaces of all the ROLLERS are clean and smooth, especially in the DEVELOPER RACK and CROSSOVERS.

[2] Remove debris from the DETECTOR ROLLERS.

[3] Check:

- CROSSOVER GUIDE SHOES are clean
- ROLLERS are correctly positioned and are rotating freely
- ROLLER GEARS, SPROCKETS, and IDLERS are engaged

[4] Install:

- ROLLERS if broken or the GUDGEONS have wear
- BEARINGS if the BEARINGS have wear
- broken SPRINGS or E-RINGS

[5] Adjust the tension on the RACK CHAIN so that the ROLLERS operate smoothly.

Solutions for the DRYER

[1] Remove debris from the DRYER AIR TUBES and the SLOTS in the DRYER AIR TUBES.

[2] Using the BOTTLE BRUSH TL-4833, clean the AIR TUBES.

[3] Rinse the AIR TUBES with water.

[4] Check that the AIR TUBES are in the correct position.

[5] Adjust the CONTROL KNOB for the DRYER TEMPERATURE to the lowest temperature that allows the film to dry.

Miscellaneous Solutions

[1] Check:

- incoming water temperature is between 4 - 29°C (40 - 85°F)
- TOP COVER is closed and the ACCESS PANELS are installed on the PROCESSOR
- no leakage of light through the LIGHT-TIGHT GASKET on the PRINTER DOCKING ASSEMBLY
- wash water is flowing
- WET SECTION COVER is in the correct position
- ventilation is correctly set and the EXHAUST HOSE is connected

Wet Films

Replenishment Solutions

[1] Check:

- replenishment rates are set for correct replenishment
- replenishment calibration is correct
- TUBING of the REPLENISHMENT SYSTEM is not bent or pinched
- REPLENISHMENT PUMP is operating
- HOSE CLAMPS are tight
- LEVEL SENSOR PROBES and CONNECTORS are clean

[2] Change any chemicals that were not mixed correctly, are exhausted, or are contaminated.

[3] When mixing chemicals, the following are recommend:

- mix a maximum of a 2 week supply of DEVELOPER REPLENISHER
- mix all chemicals and solutions as directed
- prevent contaminating the developer by using a SPLASH GUARD and DRIP TRAY when removing the FIXER RACK from the PROCESSOR

[4] Fill the REPLENISHER TANKS if the solution levels are low.

[5] Check:

- DRAIN VALVES are completely closed
- TANKS are full

Recirculation Solutions

[1] With the PROCESSOR energized and the TANKS full, check for movement of the solutions at the surface of the processing TANKS. Movement indicates flow. If no movement is observed, check:

- TUBING of the recirculation system does not have obstructions or binds
- RECIRCULATION PUMP is operating
- DEVELOPER FILTER is installed correctly

Solutions for the DRYER

[1] Check that the DRYER AIR TUBES are in the correct positions.

[2] Remove debris from the DRYER AIR TUBES and the SLOTS in the DRYER AIR TUBES.

[3] Using the BOTTLE BRUSH TL-4833, clean the AIR TUBES.

[4] Rinse the AIR TUBES with water.

[5] Adjust the CONTROL KNOB for the DRYER TEMPERATURE to the lowest temperature that allows the film to dry.

[6] Check:

- DRYER AIR EXHAUST is free from obstruction and is installed to specification
- DRYER HEATER is operating
- DRYER and EXIT ASSEMBLIES are correctly seated

Wash Water Solutions

[1] Check:

- for flow of wash water on the ROLLERS on the WASH RACK
- CROSSOVER TROUGHS are draining correctly

[2] If necessary, clean the drain holes in the CROSSOVER TROUGHS to prevent overflow of the wash water and dilution of the developer and the fixer.

Solution Levels

Replenishment Solutions

[1] Check:

- replenishment rates are set for correct replenishment
- replenishment calibration is correct
- TUBING of the REPLENISHMENT SYSTEM is not bent or pinched
- REPLENISHMENT PUMP is operating

[2] Fill the REPLENISHER TANKS if solution levels are low.

[3] Check:

- POPPET SEATS are not dirty and have no distortion that prevents correct replenishment
- LEVEL PROBES and the SPRING SPADES are clean and free from debris
- TUBING and HOSES are not bent and have no air bubbles
- DRAIN VALVES for leakage

Section 3: Diagnostics for the SORTER

Error Codes

Error Code	Error Description	Possible Cause	Action
E080	The BIN ASSEMBLY is not in position.	BIN ASSEMBLY removed from SORTER	Install the BIN ASSEMBLY.
		BIN INTERLOCK SWITCH S20	Install a BIN INTERLOCK SWITCH S20.
		4000 BOARD	Check that the 4000 BOARD is supplying 24 V on P/J 4001 PIN 3 when SWITCH S20 is ON. If necessary, install a new 4000 BOARD.
		100 BOARD	Check that the 100 BOARD is supplying 24 V on P/J123 PIN 22 when SWITCH S20 is ON. If necessary, install a new 100 BOARD.
		5000 BOARD	If the above checks do not determine the problem, install a new 5000 BOARD.
E081	The FILM TRAY is not in position.	FILM TRAY removed while TOP COVER is open	Close the TOP COVER or install the FILM TRAY.
		FILM TRAY SENSOR S21	Do an adjustment on the SENSOR S21 or install a new SENSOR.
		100 BOARD	Check that the 100 BOARD is supplying +5 V on P/J123 PIN 22 when S21 is ON. If necessary, install a new 100 BOARD.
		5000 BOARD	If the above checks do not determine the problem, install a new 5000 BOARD.

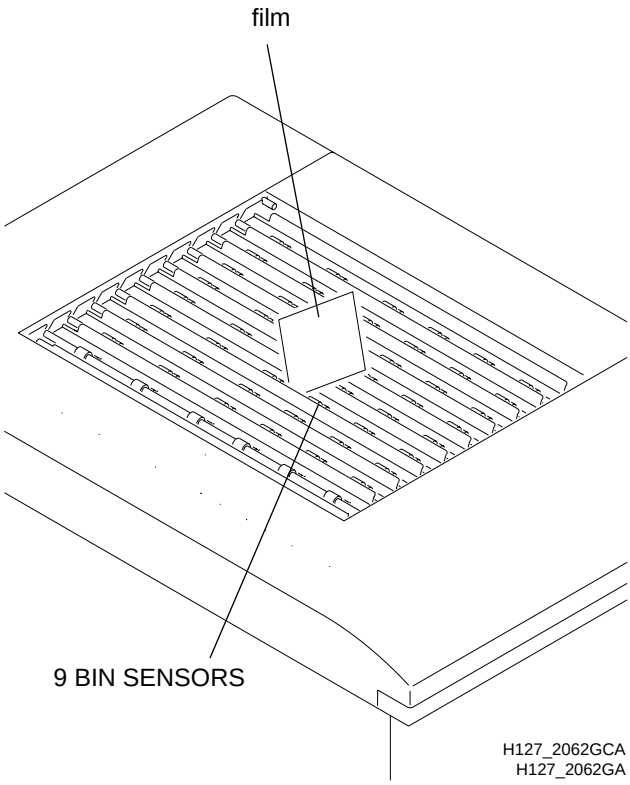
Error Code	Error Description	Possible Cause	Action
E082	The speed of the 180 LP PROCESSOR is out of range.	Transport for the PROCESSOR is not operating	1. Using the diagnostics for the LAPTOP COMPUTER, energize the transport for the PROCESSOR. 2. Check for nominal 230 V AC on the PROCESSOR MOTOR CONNECTOR B6, P/J22 PINS 2 and 3 3. If the voltage is not correct, check the FUSE F3 in the ELECTRICAL BOX of the PROCESSOR. If necessary, install a new FUSE. 4. If voltage is correct and the MOTOR is not operating, do a replacement of the MOTOR B6.
		PROCESSOR SPEED ENCODER U11or the 100 BOARD	1. Using the diagnostics for the LAPTOP COMPUTER, energize the transport for the PROCESSOR. 2. Check for 0 - 5 V pulses, nominal frequency of 26 - 30 Hz at P/J123 PIN 31 or TP16 on the 100 BOARD. 3. If there is no signal, install a new ENCODER U11. 4. If the signal is correct, check P/J123 PIN 26 for 5 V pulses, nominal frequency of 26 - 30 Hz. 5. If there is no signal, install a new 100 BOARD.
		P/J53 shows wear or corrosion	Clean P/J53.
		5000 BOARD	If the above checks do not determine the problem, install a new 5000 BOARD.

Error Code	Error Description	Possible Cause	Action
E083	The transport in the SORTER is not operating.	4000 BOARD	Check that DS3 on the 4000 BOARD indicates 24 V is supplied to the MOTOR CONTROLLER BOARD and is illuminated when the BIN INTERLOCK SWITCH is ON. If DS3 is OFF, install a new 4000 BOARD.
		5000 BOARD	1. Using the diagnostics for the LAPTOP COMPUTER, energize the DRIVE MOTOR in the SORTER. Measure: • P/J5004 PIN 10 in the ELECTRICAL BOX. The voltage should be approximately 4 V for nominal speed of 63 in./min. • P/J5007 PIN 2 in the ELECTRICAL BOX. It should be between 0 - 0.8 V. • P/J5007 PIN 3 in the ELECTRICAL BOX. It should be between 0 - 0.8 V. • P/J5007 PIN 9 in the ELECTRICAL BOX. It should be between 0 - 0.8 V. 2. If necessary, install a new 5000 BOARD.
		100 BOARD, MOTOR CONTROLLERS, DRIVE MOTOR	If the DRIVE MOTOR in the SORTER is operating: 1. Check for 0 - 5 V pulses, nominal frequency of 340 - 360 Hz at P/J111 PIN 1 or TP18 on the 100 BOARD. 2. If there is no signal, install a new DRIVE MOTOR or MOTOR CONTROLLER. 3. If the correct signal occurs on P/J111 PIN 1, check for 0 - 5 V pulses, nominal frequency of 340 - 360 Hz on P/J123 PIN 23. 4. If there is no signal, install a new 100 BOARD. If the DRIVE MOTOR in the SORTER is not operating and the 5000 BOARD is sending the correct control voltage: 1. Install a new MOTOR CONTROLLER. 2. Install a new MOTOR.
		BIN INTERLOCK SENSOR	1. If the circuit indicates that the BIN is in position, but the BIN is removed and the MOTOR CONTROLLER is de-energized, check the 100 BOARD. 2. If necessary, install a new 100 BOARD.
		Mechanical bind	Check that the transport in the SORTER has no mechanical bind. Repair if necessary.

Error Code	Error Description	Possible Cause	Action
E091-E099	Film did not arrive at BINS 1 - 9. The last digit of the error code is the BIN number.	This error could occur because the film did not arrive at the correct BIN at the expected time or because it arrived at the correct BIN but was not sensed.	
		Film jam in the SORTER	1. Clear the jam. 2. Check that the BIN capacity of 50 sheets per BIN is not exceeded. 3. Check that the films exiting the PROCESSOR are fully dry. If necessary, increase the temperature of the DRYER.
		Damp films adhering to the DIVERTER are closing the DIVERTER.	Increase the temperature of the DRYER.
		A lower numbered DIVERTER - “upstream”	Check that the DIVERTER is in the down position. Repair if necessary. See “Troubleshooting the DIVERTERS” on Page 29.
		DIVERTER X. X is the last digit in the error code.	Repair the DIVERTER. See “Troubleshooting the DIVERTERS” on Page 29.
		If the film arrived at the correct BIN but was not sensed:	
		BIN SENSOR in MODULE X. X is the last digit in the error code.	The SENSOR is not sensing film. See “Troubleshooting the BIN SENSORS” on Page 27.
E101-E109	Film jam at BIN 1 - 9. The last digit of the error code is the BIN number.	Film jam in the SORTER	1. Clear the jam. 2. Check that the BIN capacity of 50 sheets per BIN is not exceeded. 3. Check that the films at the exit of the PROCESSOR are fully dry. If necessary, increase the temperature of the DRYER.
		A DRYER or EXIT RACK in the PROCESSOR is causing a delay in the film transport.	1. Clean the DRYER and EXIT RACKS. Repair, if necessary. 2. Check for binds. 3. Check for damaged DRIVE GEARS and wear on the BEARINGS in the DRYER.
E111-E119	Film is sensed at BIN 1 - 9. The last digit of the error code, the BIN number, was not expected.	DIVERTER X. X is the last digit in the error code.	1. Check if the DIVERTER is in the down position, causing film to enter the unexpected BIN. 2. If down, repair the DIVERTER. See “Troubleshooting the DIVERTERS” on Page 29.
		BIN SENSOR in MODULE X. X is last digit in the error code.	The SENSOR is not reporting film correctly when no film is there. See “Troubleshooting the BIN SENSORS” on Page 27.

Error Code	Error Description	Possible Cause	Action
E182	The sort queue for the LASER PRINTER is full. The PRINTER is receiving “Film Exited” commands before it expects film at the exit of the PROCESSOR and entering the SORTER.	EXIT SWITCH	Check the installation and connections of the EXIT SWITCH in the EXIT RACK.
		There is an error in the connection between the PROCESSOR and the PRINTER causing the PRINTER to receive signals intermittently.	Check the connection between the PRINTER and the PROCESSOR.
E183	SORTER time has completed at the PRINTER. The LASER PRINTER did not receive a “Film In Bin” command or an error from the PROCESSOR for a film that is moving through the SORTER.	There is an error in the connection between the PROCESSOR and the PRINTER causing the PRINTER not to receive signals.	Check the connection between the PRINTER and the PROCESSOR.
		POWER SUPPLY for the PROCESSOR was reset causing removal of film destinations from memory.	Check for short circuits and high current loads on the POWER SUPPLY.
		5000 BOARD	Check the connections to the 5000 BOARD. Install a new 5000 BOARD, if necessary.
W184	There is a sort queue error for the LASER PRINTER. The PRINTER received a “Film In Bin” command A BIN number does not match the BIN number for the oldest film in the sort queue.	There is an error in the connection between the PROCESSOR and the PRINTER causing the PRINTER to receive signals intermittently. If the PRINTER does not receive one command in a series, the PRINTER queue is out of sequence with the commands received.	Check the connection between the PRINTER and the PROCESSOR.

Troubleshooting the BIN SENSORS



[1] Using the LAPTOP COMPUTER, advance to the specific test mode, “Sorter Sensor Test”. The status of the BIN SENSORS displays. With no film in the area of the SENSOR, “No Film Detected” displays.

[2] Place a sheet of film in the area of the SENSOR. “Film Detected” displays.

Note

- A malfunction might be caused by a malfunctioning SENSOR, 100 BOARD, 5000 BOARD, or loose or faulty CONNECTORS.
- If a BIN SENSOR is disconnected, the “Sorter Sensor Test” on the LAPTOP COMPUTER indicates “Film Detected” for that SENSOR.

[3] Do the following if a malfunction occurs:

(a) Interchange the BIN SENSOR with a reliable SENSOR to see if the BIN SENSOR is causing the malfunction. For example, if BIN SENSOR No. 3 is malfunctioning:

1. De-energize the PROCESSOR.
2. Disconnect the CONNECTOR P/J115 for BIN SENSOR No. 3 from the 100 BOARD.
3. Disconnect the adjacent CONNECTOR P/J116 for BIN SENSOR No. 4 from the 100 BOARD and connect CONNECTOR P/J116 to P115 on the 100 BOARD.
4. Energize the PROCESSOR. BIN SENSOR No. 3 should indicate “No Film Detected” on the LAPTOP COMPUTER.
5. Place a sheet of film in the SENSOR area for BIN SENSOR No. 4. BIN SENSOR No. 3 should indicate “Film Detected” on the LAPTOP COMPUTER.
6. If the interchanged BIN SENSOR operates correctly, remove the malfunctioning BIN SENSOR and install a new BIN SENSOR.

Note

The BIN SENSOR No. 9 is not used. You can interchange this MODULE with any other MAIN MODULE to temporarily repair a SORTER that has a malfunctioning SENSOR.

(b) Remain in the “Sorter Sensor Test” to keep the enable signal ON.

(c) Using a STORAGE OSCILLOSCOPE, check the enable signal for the SENSOR for a pulsed 5 V signal at P/J5008 PIN 14 on the 5000 BOARD.

(d) If no signal occurs, install a new 100 BOARD.

(e) If the signal occurs at P/J5008 PIN 14, check for a pulsed 5 V signal, with the signal OFF, at P/J113 PIN 5 or TP15 on the 100 BOARD. Keep the signal OFF by blocking the SENSOR.

(f) If no signal occurs, install a new 100 BOARD.

(g) If the problem is still not determined, check the output signal for the SENSOR from the 100 BOARD at the PINS in the table below. There should be a pulsing 5 V signal, ON for 80 microseconds, OFF for 100 milliseconds, when film is in the area of the BIN SENSOR. There should be a 0 V signal when no film is in the area.

PIN No. on P/J123	BIN SENSOR No.
2	1
4	2
6	3
8	4
10	5
12	6
14	7
16	8
18	9

(h) If no signal occurs, install a new 100 BOARD.

(i) If the problem continues, install a new 5000 BOARD.

Troubleshooting the DIVERTERS

[1] Using the LAPTOP COMPUTER, go to the specific test mode, “Sorter Component Test”. Activate the DIVERTERS to check that the DIVERTER is up when the DIVERTER is OFF and down when the DIVERTER is ON.

Important

A malfunction might be caused by a malfunctioning:

- or loose CONNECTORS
- DIVERTER SOLENOID
- 5000 BOARD
- 100 BOARD

See “Diagrams” on Page 31 for the CONNECTORS. The 100 BOARD might fail in the mode of applying a constant 24 V to the SOLENOID. This frequently causes a failure of the SOLENOID, a partial short circuit of the coil. If you install a SOLENOID only, the malfunctioning BOARD might cause the SOLENOID to have a failure. If a BOARD is installed with a malfunctioning SOLENOID, the malfunctioning SOLENOID might cause the BOARD to have failure. You must do the following steps in sequence.

[2] Manually move the DIVERTER to check that the DIVERTER:

- is operating smoothly
- has no bind
- has all SPRINGS and other parts

Caution

Prevent damage to the BOARD. Do not connect a SOLENOID that has resistance that is not correct.

[3] Measure the resistance of the SOLENOID. It should be approximately 9 - 11 Ω. If the resistance is not correct, install a SOLENOID.

[4] Check the signal from the 5000 BOARD at the PINS in the table below. The voltage should be 0 V when the DIVERTER is de-energized and 5 V when the DIVERTER is energized. If the voltage is not correct, install a new 5000 BOARD.

PIN No. on P/J5006	DIVERTER No.
7	1
8	2
9	3
10	4
11	5
13	6
14	7
15	8

Warning

Dangerous Voltage. You must de-energize the PROCESSOR before you disconnect or connect a SOLENOID.

[5] De-energize the PROCESSOR. Disconnect the SOLENOID.

[6] Measure the voltage at the CONNECTOR for the SOLENOID on the 100 BOARD:

(a) Using the “Sorter Component Test”, check that the voltage is 0 with the DIVERTER OFF.

(b) Energize the DIVERTER. At first, the voltage should be 20 - 24 V and fall to 4 - 6 V during the next ¼ second.

(c) If these signals are not correct, install a new 100 BOARD.

[7] Install a DIVERTER SOLENOID with a reliable SOLENOID to see if the SOLENOID is causing the malfunction. For example, if the DIVERTER SOLENOID No. 3 is malfunctioning:

(a) Disconnect CONNECTOR P/J103 for the DIVERTER SOLENOID No. 3 from the 100 BOARD.

(b) Disconnect the adjacent CONNECTOR P/J104, for BIN SENSOR No. 4, from the 100 BOARD, and connect it to P103 on the 100 BOARD.

(c) Using the LAPTOP COMPUTER “Sorter Component Test”, energize DIVERTER SOLENOID No. 3.

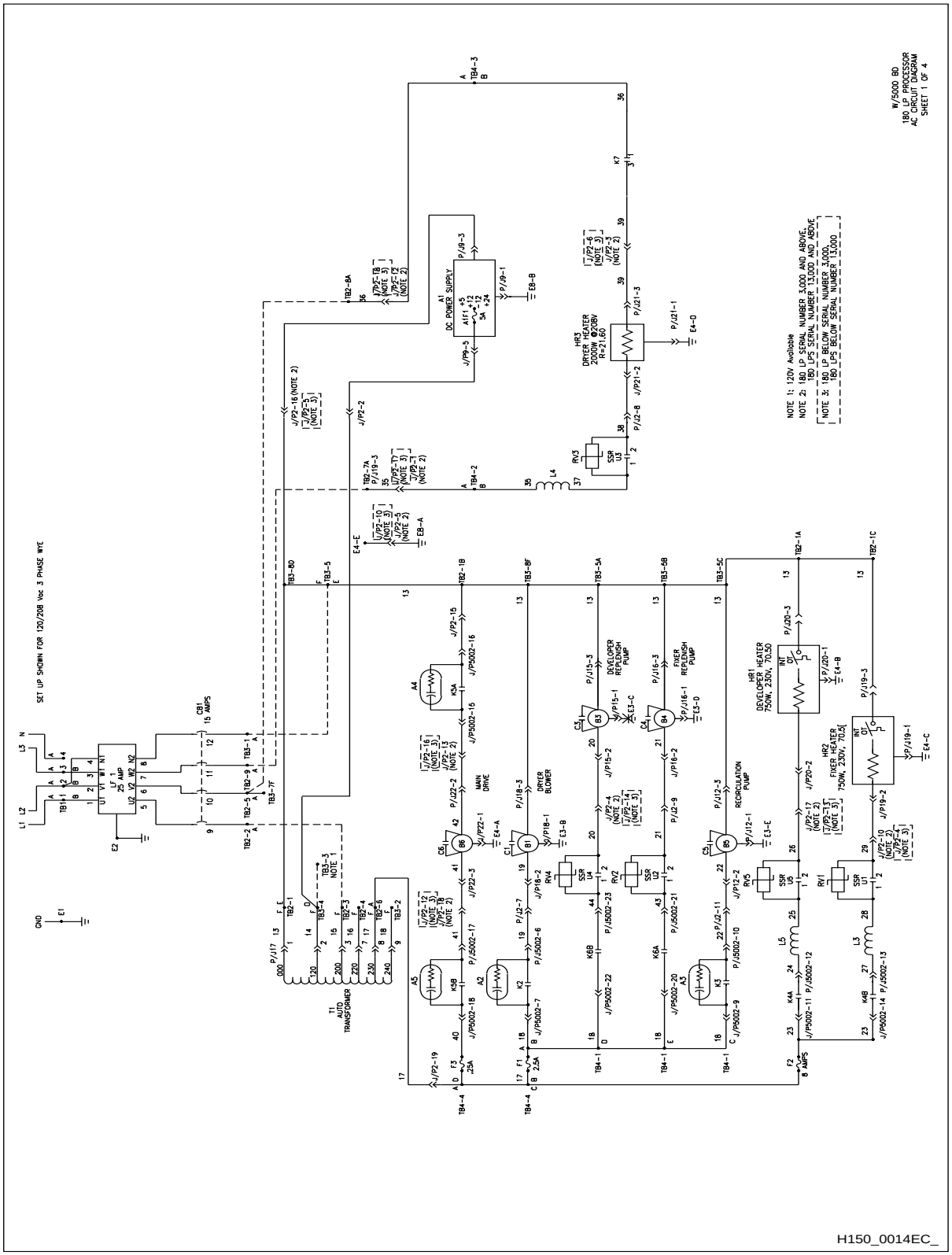
(d) If the interchanged SOLENOID works correctly, remove the malfunctioning DIVERTER SOLENOID and install a DIVERTER SOLENOID that you disconnected in Step 7a.

Note

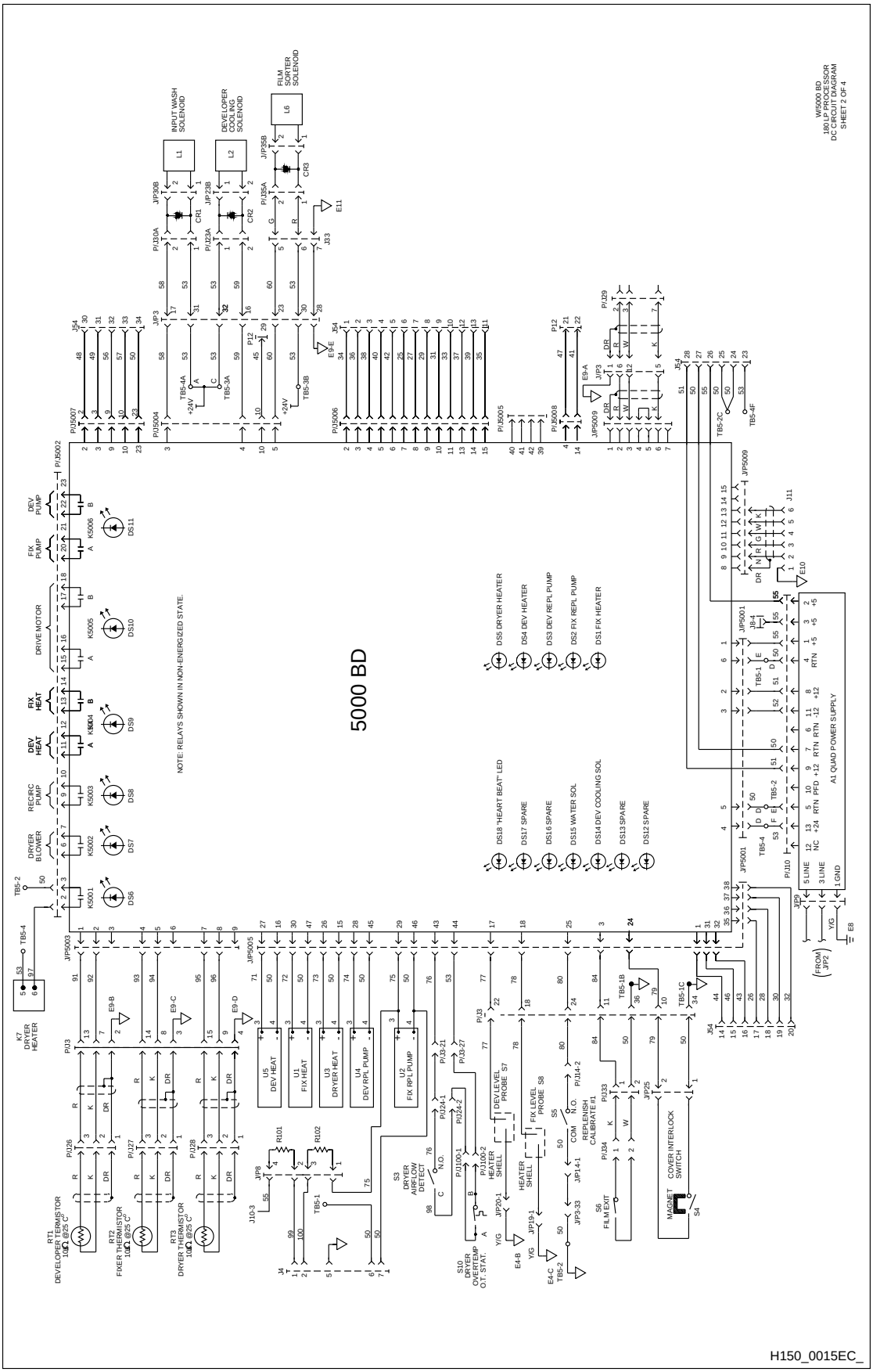
If you measure the output of the 100 BOARD to the DIVERTER SOLENOID, the voltage should be 20 - 24 V for ¼ second after the SOLENOID is energized and remain at 4 - 6 V after ¼ second.

Section 4: Diagrams

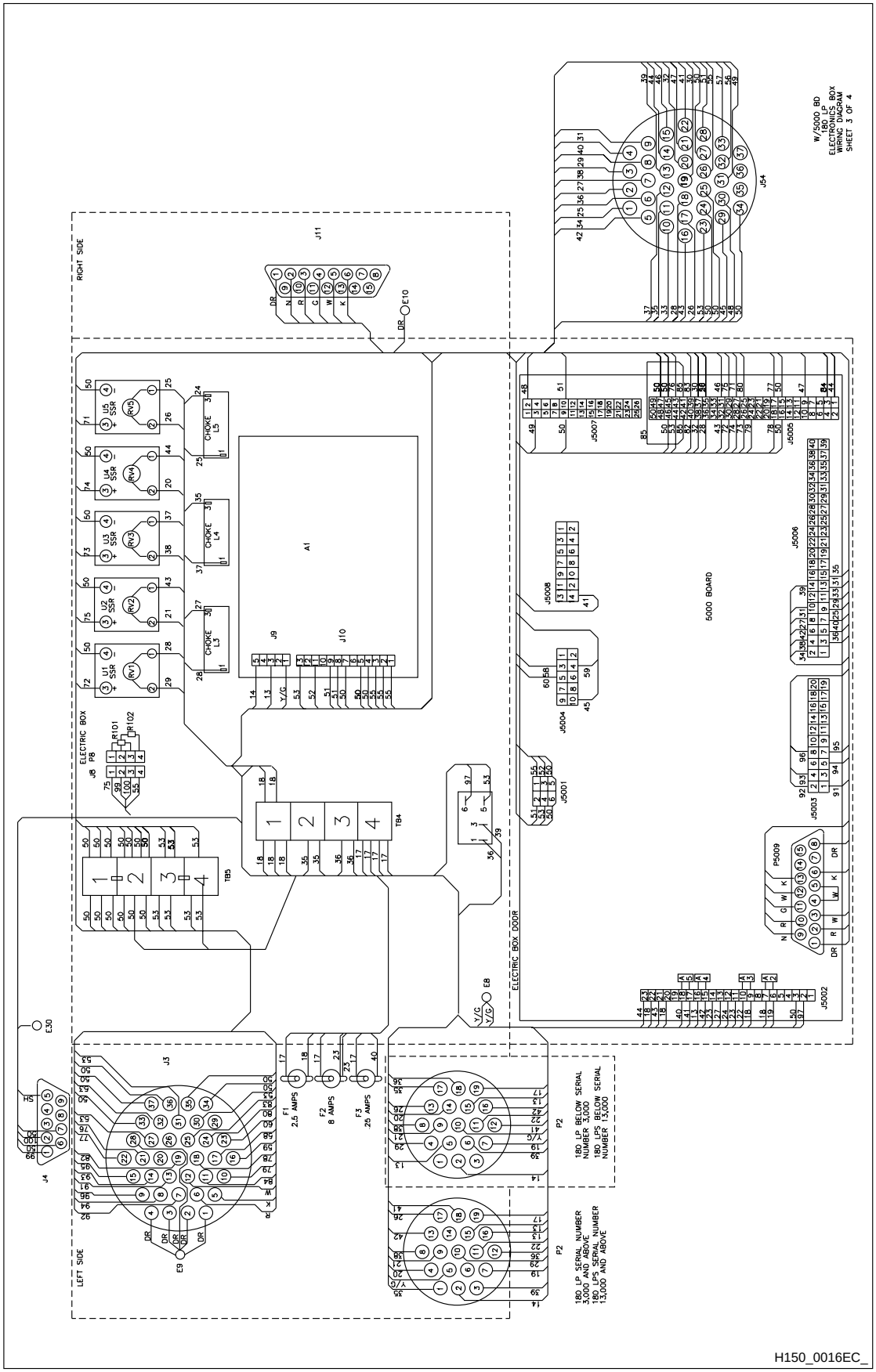
AC Diagram for a 5000 BOARD Installed in the PROCESSOR


W/5000 BD
180 LP PROCESSOR
AC CIRCUIT DIAGRAM
SHEET 1 OF 4
SET UP SHOWN FOR 120/208 Vac 3 PHASE WYE
NOTE 1: 120V Available
NOTE 2: 180 LP SERIAL NUMBER 3,000 AND ABOVE
180 LPS SERIAL NUMBER 13,000 AND ABOVE
NOTE 3: 180 LP BELOW SERIAL NUMBER 3,000
180 LPS BELOW SERIAL NUMBER 13,000
DC POWER SUPPLY
DEVELOPER REPLENISH PUMP
FIXER REPLENISH PUMP
DRYER BLOWER
MAIN DRIVE
RECIRCULATION PUMP
DEVELOPER HEATER 750W, 230V, 70.5Ω
FIXER HEATER 750W, 230V, 70.5Ω
DRYER HEATER 2000W, 60.08W 24.2Ω
AUTO TRANSFORMER
H150_0014EC_

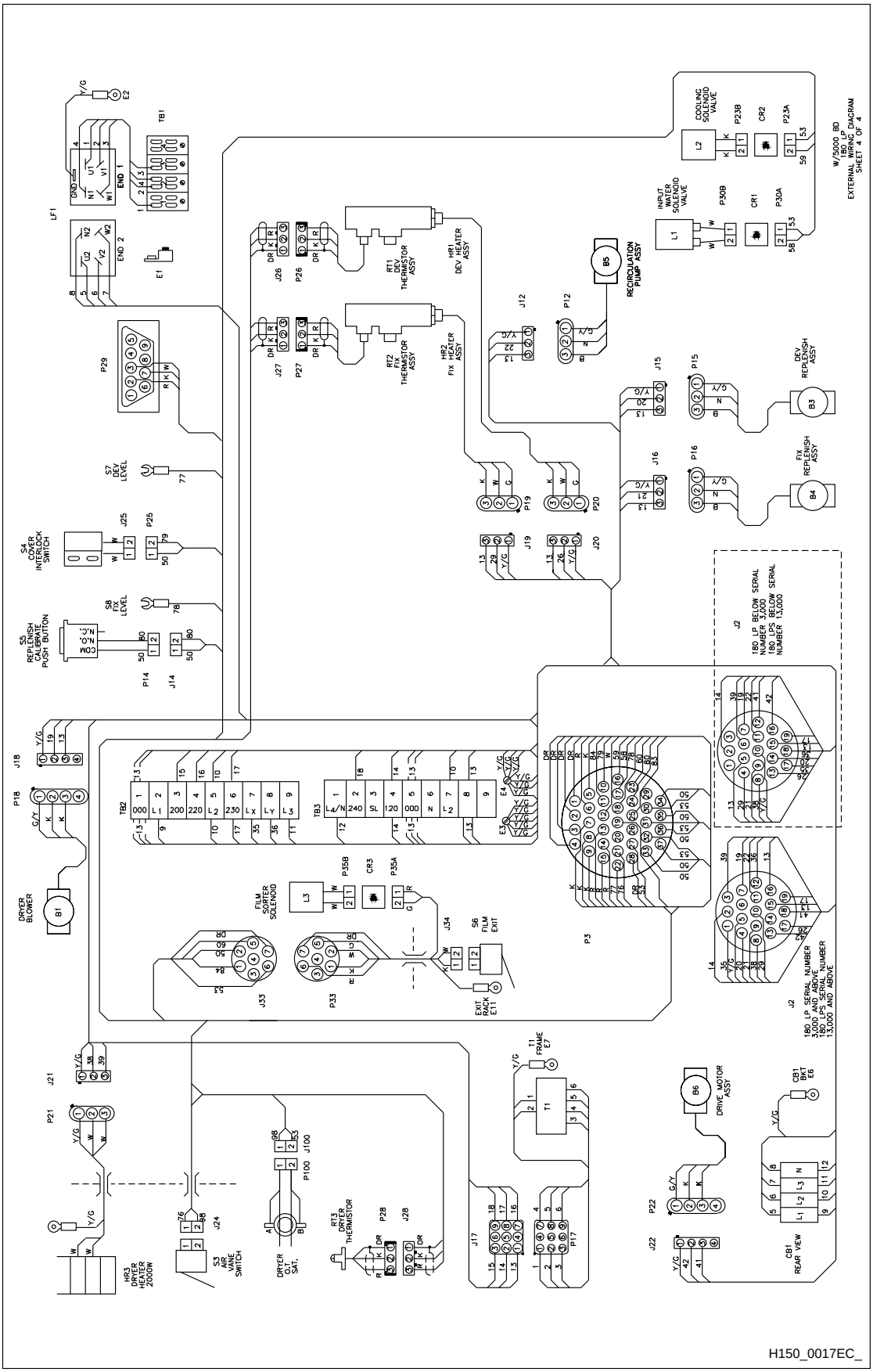
DC Diagram for a 5000 BOARD Installed in the PROCESSOR



ELECTRICAL BOX for a 5000 BOARD Installed in the PROCESSOR



External Wiring Diagram for a 5000 BOARD Installed in the PROCESSOR



Section 5: Illustrated Parts List

Figure 1 5000 BOARD

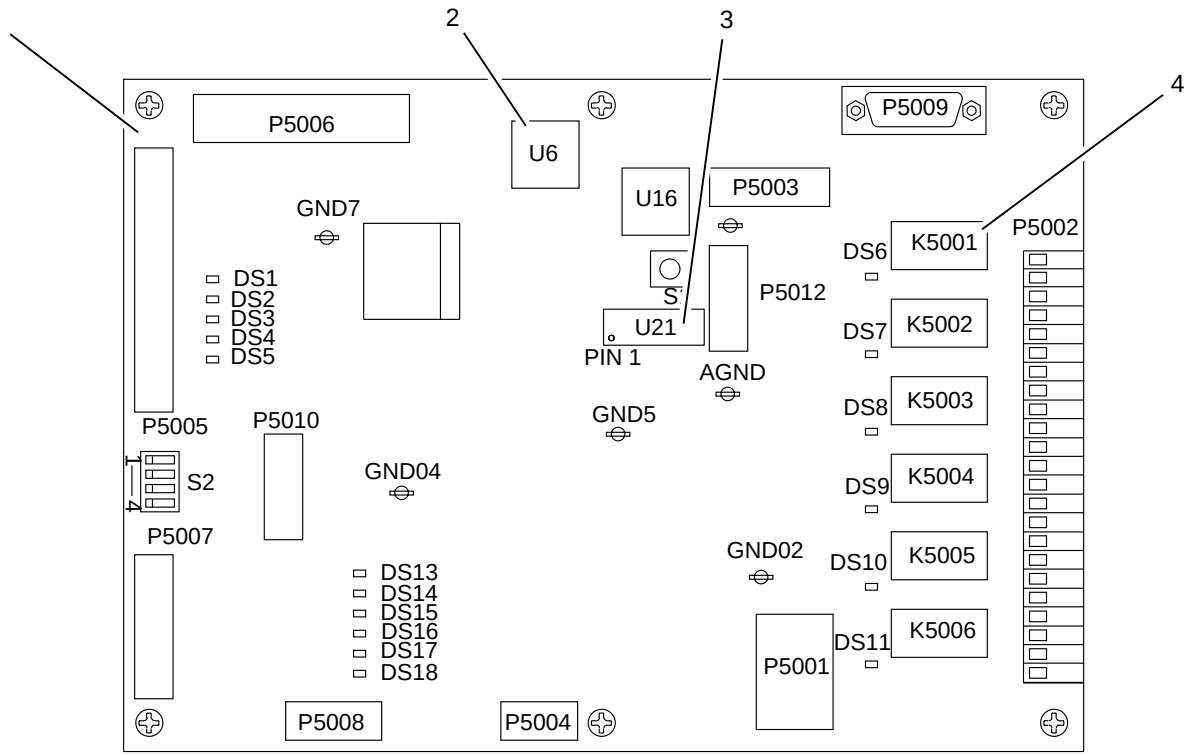


Figure 1 5000 BOARD

Item	Part No.	Description	Qty.	Notes
1	6E5142	5000 BOARD	1	Includes Items 2 - 4
2	8B6711	PROM - Boot	1	U6
3	979762	CLOCK/MEMORY MODULE	1	U21 is not included with 6E5142
4	1E5661	RELAY 8A	6	RELAYS K1 - K5
5	6E5137	OPERATING SOFTWARE for the 5000 BOARD	1	not shown
6	7E6705	DIAGNOSTICS SOFTWARE for the 5000 BOARD	1	not shown

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Print Date	Pub No.	ECO No.	Affected Pages	File Name	Notes
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